PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 :		(11) International Publication Number:	WO 93/19969
B62C 1/08, 5/02	A1	(43) International Publication Date:	14 October 1993 (14.10.93)

(21) International Application Number: PCT/AU92/00148

(22) International Filing Date: 7 April 1992 (07.04.92)

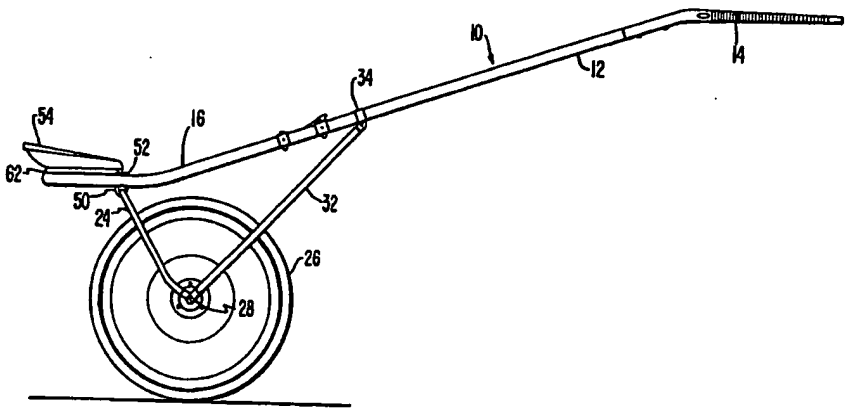
(71)(72) Applicant and Inventor: WALSH, James, Stephen [AU/AU]; 122 Gow Street, Padstow, NSW 2211 (AU).

(74) Agent: COYNE, Patrick, J.; Collier, Shannon & Scott, Level 3, 16-18 O'Connell Street, Sydney, NSW 2000 (AU).

(81) Designated States: AU, CA, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, MC, NL, SE).

Published
With international search report.

(54) Title: HORSE DRAWN SULKY



(57) Abstract

A horse drawn sulky (10) includes a pair of transversely separted wheels (26) attached to and depending from a U-shaped tubular frame (16), and a pair of tubular shafts (12) attached to and extending forwardly from opposite sides of the frame (16) and wheels (26). The pair of tubular shafts (12) are adpated for attachment to a horse generally centrally therebetween. A driver's seat (54) is attached to the frame (16) rearwardly and centrally of the shafts (12). A pair of adjustable fasteners (34) are provided for selectively adjust the shafts (12) downwardly toward the horse to increase weight transmitted from the horse to the shafts (12) and upwardly from the horse to decrease weight transmitted from the horse to the shafts (12), movement being accommodated for by pivotally mounting the transversely connected rear struts (24) by means of U-shaped connectors (50) to the U-shaped tubular frame (16). The pair of wheels (26) may be transversely offset relative to the longitudinal centre line between the pair of shafts (12) while the seat (54) may be pivotally connected to the transverse portion of rear struts (54) for corresponding adjustment to upward or downward movement of the shafts (12).

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FR	France	MR	Mauritania
AU	Australia	GA	Gabon	MW	Malawi
BB	Barbados	GB	United Kingdom	NL	Netherlands
BE	Belgium	GN	Guinea	NO	Norway
BF	Burkina Faso	GR	Greece	NZ	New Zealand
BG	Bulgaria	HU	Hungary	PL	Poland
BJ	Benin	IE	Ireland	PT	Portugal
BR	Brazil	IT	Italy	RO	Romania
CA	Canada	JP	Japan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo			SE	Sweden
CH	Switzerland	KR	Republic of Korea	SK	Slovak Republic
CI	Côte d'Ivoire	KZ	Kazakhstan	SN	Senegal
CM	Cameroon	LI	Liechtenstein	SU	Soviet Union
CS	Czechoslovakia	LK	Sri Lanka	TD	Chad
CZ	Czech Republic	LU	Luxembourg	TG	Togo
DE	Germany	MC	Monaco	UA	Ukraine
DK	Denmark	MG	Madagascar	US	United States of America
ES	Spain	ML	Mali	VN	Viet Nam
FI	Finland	MN	Mongolia		

HORSE DRAWN SULKY

The present invention relates to a horse drawn sulky of the type used in sulky racing.

BACKGROUND OF THE INVENTION

Racing sulkies vary in both the length and width thereof. By shortening the sulky, the driver is placed closer to the horse to result in improved aerodynamics of the combined horse and driver. This results in less drag and correspondingly greater speed. The disadvantage of this structure is that the distance between the wheels has to be increased to prevent injury resulting from the horse kicking the sulky wheel while making a turn. Therefore, the horse must run further from the rail during turning and hence run a greater distance around each curve. This, of course, results in increasing the horse's time for completing a race. This problem may be avoided by lengthening the sulky. This results, however, in increasing the aerodynamic drag resulting from the combined horse and driver to result in decreased speed.

It has been determined that a horse's racing performance may be improved by adjusting the amount of weight transmitted from the horse to the sulky via the shafts of the sulky attached to the horse. Specifically, in this regard, the more weight transmitted from the horse via the shafts to the sulky results in increasing the angle to a preferred 90° angle between the vertical axis of the horse's hoof and the track surface when negotiating a bend. This decreases the likelihood of injury to the horse during racing. If too little weight is transmitted from the horse via the shafts, however, during turning the horse will tend to lean further into the turn, which causes pain to the horse and decreases the speed of the horse. Generally, as the weight transmitted from the horse via the shafts to the sulky is increased, this reduces the net effort required of the horse to move himself and the sulky. It has been determined that arbitrarily the performance of a horse will vary depending upon the amount of weight transmitted from the horse to the sulky and the specific weight for optimum performance can only be determined through trial for a particular horse.

OBJECTS OF THE INVENTION

It is accordingly a primary object of the present invention to provide a horse drawn sulky that provides advantages over conventional sulkies from the standpoint of permitting increased safety without sacrificing performance.

A more particular object of the invention is to provide a sulky wherein the length of the sulky may be shortened without incurring increased jeopardy of the horse's hooves striking the sulky wheel during turns.

Another specific object of the invention is to provide a sulky wherein the amount of weight removed from the horse by the shafts of the sulky may be readily adjusted to provide an optimum amount of weight removed for any given combination of horse, driver and racing gait.

Additional objects and advantages of the invention are set forth, in part, in the description which follows and, in part, will be obvious from the description or may be learned by practice of the invention. The objects and advantages of the invention will be realized in detail by means of the instrumentalities and combinations particularly pointed out in the appended claims.

SUMMARY OF THE INVENTION

In accordance with the invention, a horse drawn sulky is provided that includes a pair of transversely separated wheels attached to and extending from a tubular frame and a pair of shafts attached to and extending forwardly from opposite sides of the frame and wheels. The pair of tubular shafts are adapted for attachment to a horse generally centrally therebetween. A driver's seat is attached to the frame rearwardly and centrally of the shafts.

Additional means are provided for selectively adjusting the pair of shafts that includes means for selectively attaching said pair of wheels to said frame and pair of shafts at a relatively more forward position to increase the weight transmitted from the horse to the shafts or at a relatively more rearward position to decrease the weight transmitted to the shafts from the horse.

The means for selectively attaching the pair of wheels to the frame and shafts may include a pair of front struts associated with each wheel and connected at one end thereof to an axle of each wheel on opposite sides thereof and at another end thereof to one of the shafts by a fastener. The fastener is adapted for positioning longitudinally

along the shaft to fasten the pair of struts to the shaft at a selected longitudinal position therealong. The position of the fastener is moved relatively forward to increase the weight transmitted to the shafts from the horse and relatively rearward to decrease the weight transmitted to the shafts from the horse.

Means are provided for attaching the pair of wheels to the frame that includes a transverse tube extending beneath and transversely across the frame. The transverse tube has at each end thereof a pair of rear struts connected to an axle of each wheel on opposite sides thereof. Means are provided for connecting the transverse tube to the frame in releasable engagement to permit axial rotation of the transverse tube to move, as a unit. As embodied herein, each pair of rear struts moves forwardly upon relative forward movement of each of the pair of front struts and moves rearwardly upon relatively rearward movement of each of the pairs of front struts.

The driver's seat may be attached at a front end thereof to the transverse bar by seat attaching means. Seat attaching means permit the seat to be pivoted forwardly about the transverse bar upon relative forward movement of the front struts and rearwardly upon relative rearward movement of the pair of the front struts.

The wheels may be transversely offset relative to the longitudinal center line of the pair of shafts.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only, and are not restrictive of the invention as claimed. The accompanying drawings, which are incorporated herein by reference, and constitute a part of the specification, illustrate certain embodiments of the invention, and together with the detailed description, serve to explain the principles of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 of the drawings is a side elevation of one embodiment of a sulky in accordance with the invention;

Fig. 2 is a plan view of the sulky of Fig. 1;

Fig. 3 is a front elevation of the sulky of Fig. 1;

Fig. 4 is a detailed view of a fastener embodied in the sulky; and

Fig. 5 is a detailed view of one embodiment of a structure for pivotally mounting the seat of the sulky.

Fig. 6 is a detailed side view of a preferred embodiment of the structure for pivotably mounting the seat of the sulky.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the drawings, and for the present to Figs. 1, 2, and 3 thereof, there is shown an embodiment of a sulky in accordance with the invention, designated generally as 10. The sulky has a pair of shafts 12 extending forwardly one on either side of the sulky. The shafts are of tubular construction. At a forward end of the shaft is a portion thereof generally known as a point, which is designated as 14. The opposite end of the shafts 12 are connected to a generally U-shaped tubular structure 16 commonly termed a "back bend" or "back bow." An undercarriage, designed generally as 18, extends generally transversely beneath the back bend 16.

The undercarriage 18 includes an upper transverse tube 20 and a lower transverse tube 22. These tubes are connected to a pair of rear struts 24. The struts 24 are connected to wheels 26 on opposite sides thereof at a wheel hub 28 connected to opposite ends of axle 30. A pair of front struts 32 is connected also to the hub 30 of each wheel at one end thereof, with an opposite end connected to shaft 12 by a fastener designated generally as 34 and shown in detail in Fig. 4.

The fastener 34 has an annular band 36 extending around shaft 12 in gripping relationship thereto. The annular band 36 has a pair of opposed tabs 38 and 40 fastened thereto. An opening 40 is provided in tab 38 and an opening 42 is provided in tab 40 through which bolt 44 extends. The end portion 46 of front strut 32 has a mating opening (not shown) through which bolt 44 extends. A nut 48 is provided in threaded engagement with the bolt 44. Upon tightening of the nut 48 relative to the bolt 44, the end 46 of the front strut 32 is connected to the shaft 12. With this arrangement, the fastener 34, as shown in Fig. 4, permits the longitudinal movement of struts 32 to move the wheels forwardly or rearwardly to respectively decrease or increase the weight imparted to the sulky by the horse.

The transverse tube 20 of the undercarriage 18 is connected to the back bend by a pair of identical U-shaped connectors 50 having threaded end portions (not shown)

onto which cap nuts 52 are tightened in threaded engagement to secure the undercarriage to the back bend. With this arrangement, the undercarriage 18 and the associated rear struts 24 may be adjusted by pivoting the same forward or rearward upon the mounting of front struts 32 of varying lengths between the wheel hubs 28 and the fastener 34 associated with the shafts 12.

A seat 54 is pivotally connected to the upper transverse rod 20 of the undercarriage 18, as shown in detail in Figs. 5 and 6. As shown in Fig. 5, the pivotal connection is made by tab 56 connected to rod 20, where tab 56 is connected to pivot link 58. Pivot link 58 has an opening (not shown) through which rod 60 is inserted. In this embodiment, rod 60 is threaded, and it is secured to tab 58 by a threaded nut. As shown in Fig. 3, this structure is duplicated on opposite sides of the seat 54.

It will be apparent to those skilled in the art that various modifications and variations can be made in the construction and configuration of the seat connector without departing from the scope or spirit of the invention. In another, preferred, embodiment of the invention, a seat 54 is pivotally connected to the upper transverse rod 20 of the undercarriage 18, as shown in detail in Fig. 6, where a seat bracket 59 is used instead of the aforementioned tab 56 and pivot link 58. This pivotal connection of the seat 54 to the undercarriage 18 is achieved, as shown in Fig. 6, by the rod 60 extending through the seat mounting platform 62 and through the curved slot of the seat bracket 59. As shown in Fig. 3, this structure is duplicated on opposite sides of the seat 54. The undercarriage 18 may be pivoted about the rod 60 extending through seat bracket 59 and mounting platform 62 to achieve the desired position relative to the location of the fastener 34. Seat brackets 59 enable undercarriage 18 to be rotated about its pivoting connection without having to tighten or loosen nuts and bolts.

As best shown in Figs. 2 and 3, the wheels of the sulky are offset from the center line between the shafts on the right side of the sulky facing forward. With this offset, during racing on a track in a counterclockwise direction, the horse's hooves are maintained at a greater distance from the outside right wheel of the sulky so that the sulky may be made shorter without jeopardy of interference of the horse's hooves with the wheel during turning. As described earlier, by making the sulky shorter the drag is decreased to increase speed. This is achieved without increasing the width of the

sulky as is necessary with symmetrically wheeled sulkies. Likewise, with the use of offset wheels, the turning radius is decreased to increase the turning speed.

The sulky may be adjusted to provide the selected, optimum amount of weight transmitted through the shafts from the horse. To increase the weight, fastener 34 is moved forward. Conversely, fastener 34 is moved rearward to reduce the weight transmitted to the sulky from the horse. When varying the position of the fastener 34, the connection 50 permits the undercarriage 18 to be accordingly adjusted by pivoting about U-shaped fasteners 50. The seat may be adjusted correspondingly by means of pivoting the same about the rod 60 and the pair of seat brackets 59 as shown in Fig. 6 and described above.

It will be apparent to those skilled in the art that various modifications and variations can be made in the construction and configuration of the present invention without departing from the scope or spirit of the invention. For example, various changes may be made in the fastener, so long as it still retains the ability to securely hold the struts to the shaft. Further, it may be appropriate to make additional modifications, such as modifying the shape or configuration of the seat bracket, so long as the undercarriage is still able to be rotated about its pivoting connection. Thus, it is intended that the present invention cover the modifications and variations of the invention provided they come within the scope of the appended claims and their equivalents.

I CLAIM:

1. A horse drawn sulky, including a pair of transversely separated wheels attached to and depending from a tubular frame and a pair of tubular shafts attached to and extending forwardly from opposite sides of said frame and wheels, said pair of tubular shafts being adapted for attachment to a horse generally centrally therebetween, a drivers seat attached to said frame rearwardly and centrally of said shafts and means for selectively adjusting said pair of shafts downwardly toward the horse to decrease weight transmitted from the horse to the shafts and upwardly from the horse to increase weight transmitted from the horse to the shafts.

2. The sulky of claim 1, wherein said means for selectively adjusting said pair of shafts includes means for selectively attaching said pair of wheels to said frame and pair of shafts at a relatively more forward position to increase the weight transmitted from the horse to the shafts and a relatively more rearward position to decrease the weight transmitted to the shafts from the horse.

3. The sulky of claim 2, wherein said means for selectively attaching said pair of wheels to said frame and pair of shafts includes a pair of front struts associated with each said wheel and connected to one end thereof to an axle of each said wheel on opposite sides of each said wheel and at another end thereof to one of said shafts by a fastener, said fastener being adapted for positioning longitudinally along said shaft to fasten said pair of struts to said shaft at a selected longitudinal position therealong, with the position of said fastener being relatively forward to increase the weight transmitted to the shafts from the horse and relatively rearward to decrease the weight transmitted to the shafts from the horse.

4. The sulky of claim 3, wherein said means for attaching said pair of wheels to said frame includes a transverse tube extending beneath and transversely across said frame, said transverse tube having at each end thereof a pair of rear struts connected to an axle of each said wheel on opposite sides thereof, means for connecting said transverse tube to said frame in releasable engagement to permit axial rotation of said transverse tube to move, as a unit, each said pair of rear struts forwardly upon relative

forward movement of each said fastener and rearwardly upon relative rearward movement of each said fastener.

5. The sulky of claim 4, wherein the drivers seat is attached at a front end thereof to said transverse bar by seat attaching means for permitting said seat to be pivoted forwardly about said transverse bar upon relative forward movement of each said fastener and rearwardly upon relative rearward movement of each said fastener.

6. A horse drawn sulky, including a pair of transversely separated wheels attached to and depending from a tubular frame and a pair of shafts attached to and extending forwardly from opposite sides of said frame and wheels, said pair of wheels being transversely offset relative to a longitudinal center line between said pair of shafts, said pair of shafts being adapted for attachment to a horse generally centrally therebetween, a drivers seat attached to said frame rearwardly and centrally of said shafts.

7. The horse-drawn sulky of claim 6, wherein said means for selectively adjusting said pair of wheels to said frame and pair of shafts at a relatively more forward position to increase the weight transmitted to the shafts from the horse and at a relatively more rearward position to decrease the weight transmitted to the shafts from the horse.

8. The horse-drawn sulky of claim 7, wherein said means for selectively attaching said pair of wheels to said frame and pair of shafts includes a pair of front struts associated with each said wheel and connected at one end thereof to an axle of each said wheel on opposite sides of each said wheel, and at another end thereof to one of said shafts by a fastener, said fastener being adapted for positioning longitudinally along said shaft to fasten said pair of struts to said shaft at a selected longitudinal position therealong, with the position of said fastener being relatively forward to increase the weight transmitted to the shafts from the horse and relatively rearward to decrease the weight transmitted to the shafts from the horse.

9. The horse-drawn sulky of claim 8, wherein said means for attaching said pair of wheels to said frame includes a transverse tube extending beneath and transversely across said frame, said transverse tube having at each end thereof a pair of rear struts connected to an axle of each said wheel on opposite sides thereof, means for connecting said transverse tube to said frame in releasable engagement to permit

actual rotation of said transverse tube to move, as a unit, each said pair of rear struts forwardly upon relatively forward movement of each said fastener and rearwardly upon relatively rearward movement of each said fastener.

10. The horse-drawn sulky of claim 9, wherein the driver's seat is attached at a front end thereof to said transverse tube by seat attaching means for permitting said seat to be pivoted forwardly about said transverse tube upon relatively forward movement of each said fastener and rearwardly upon relative rearward movement of each said fastener.

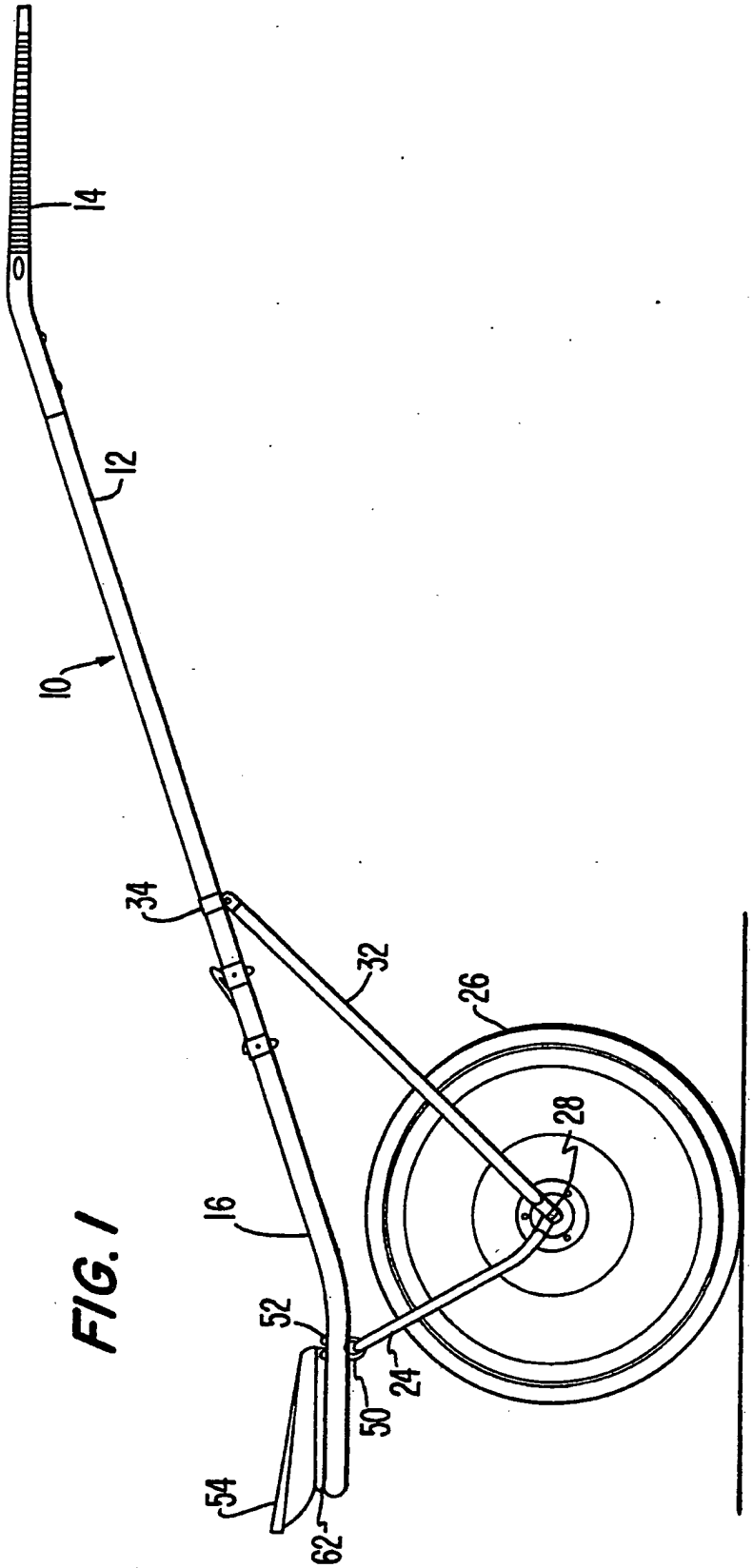


FIG. 1

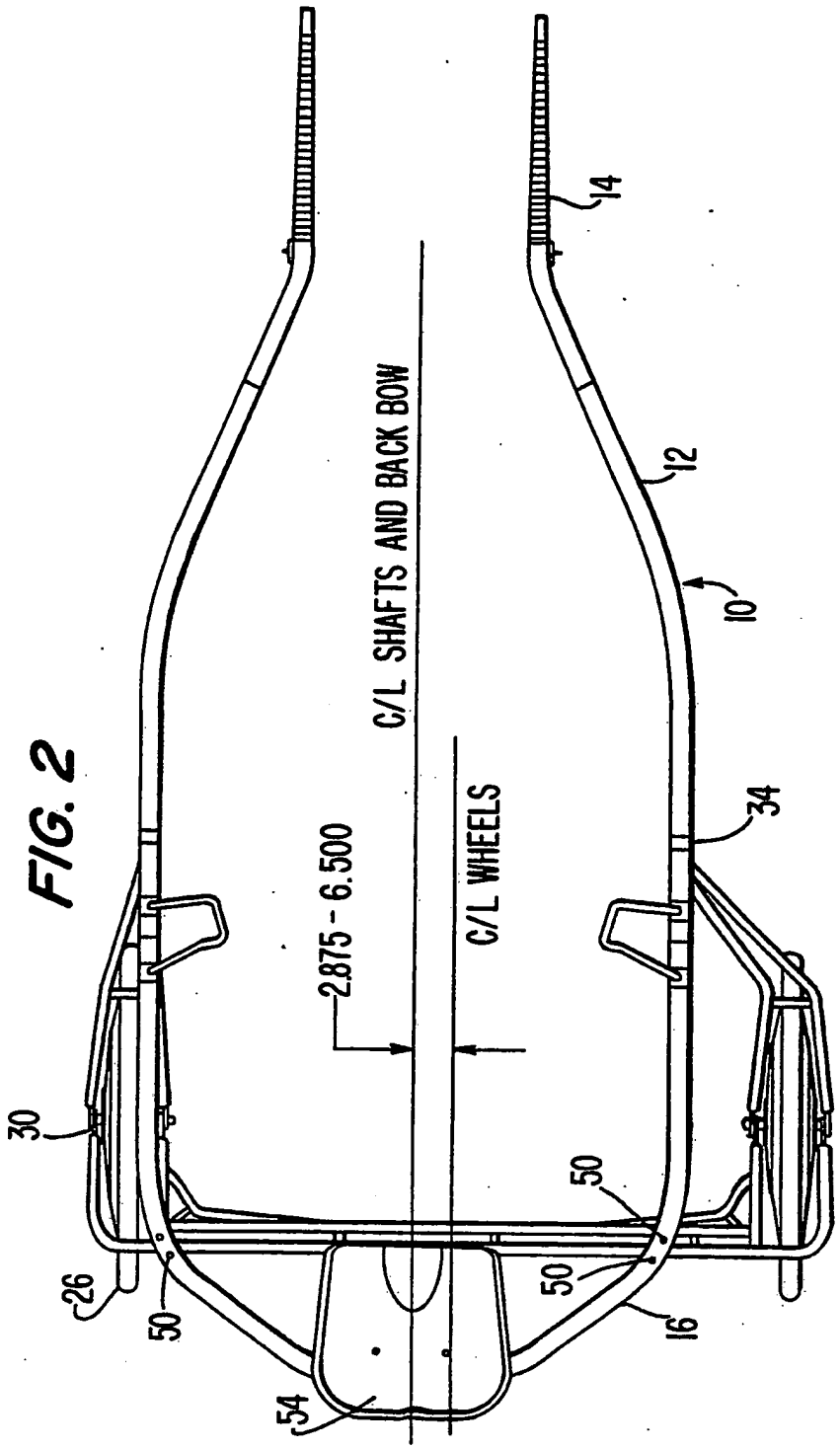

C/L SHAFTS AND BACK BOW
C/L WHEELS
2.875 - 6.500
14
12
10
34
30
26
50
50
50
16
54

FIG. 2

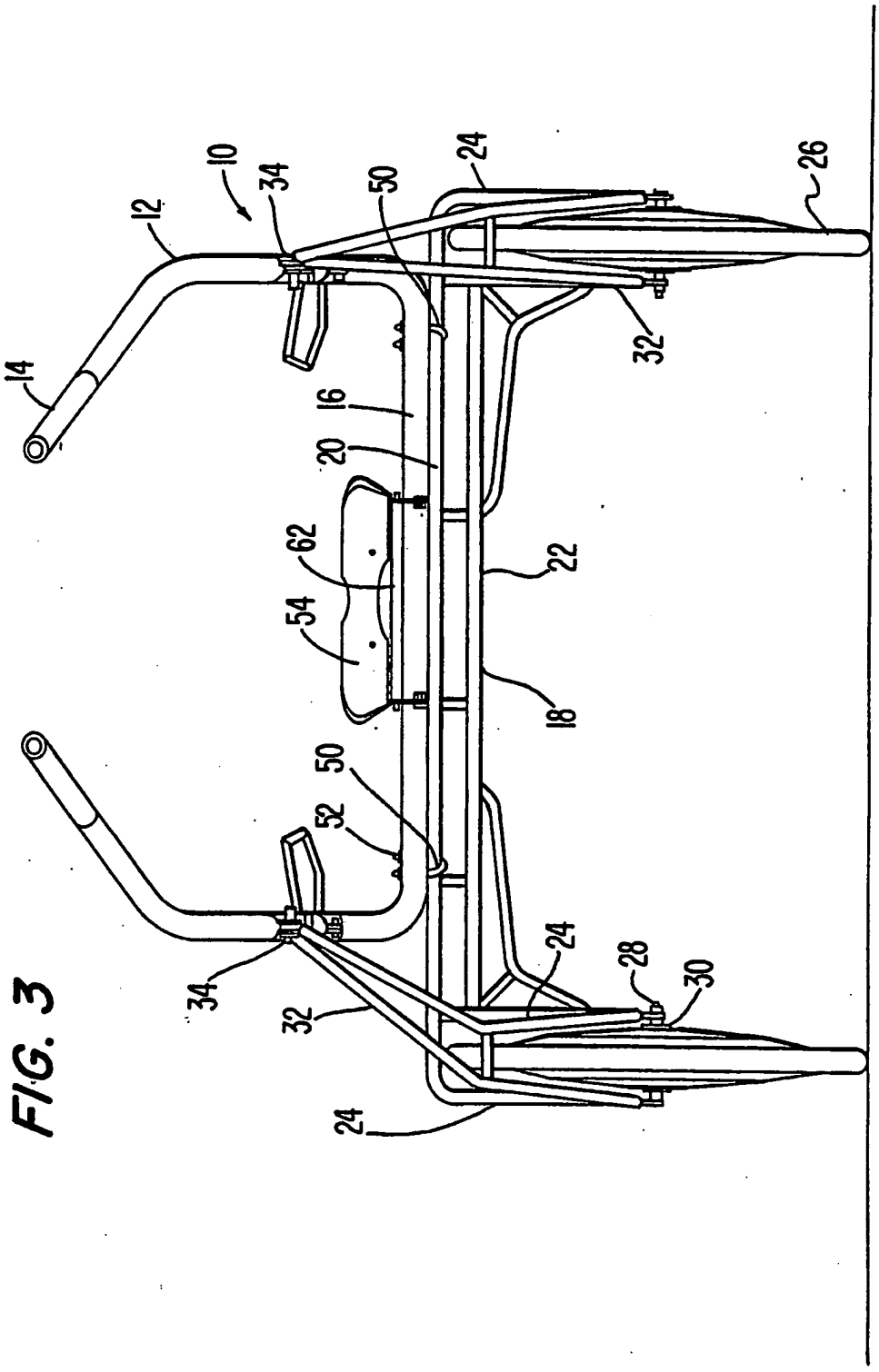
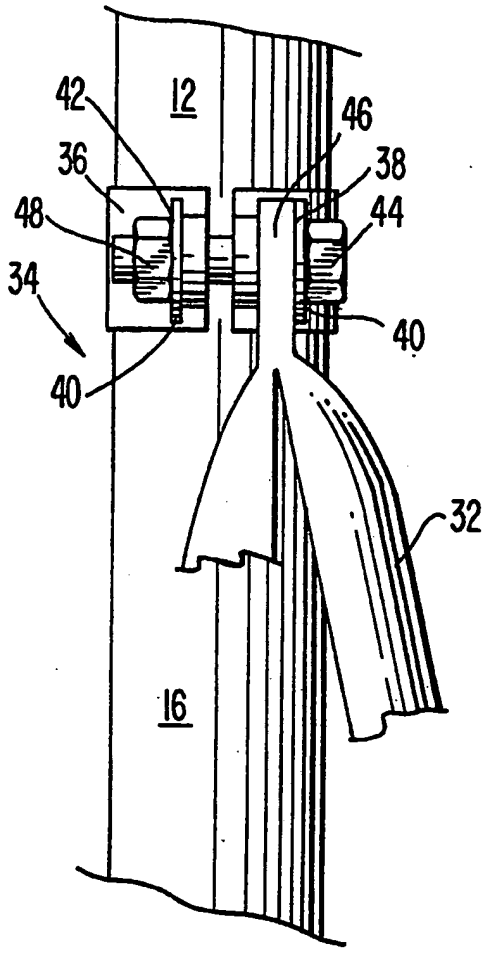


FIG. 3

FIG. 4



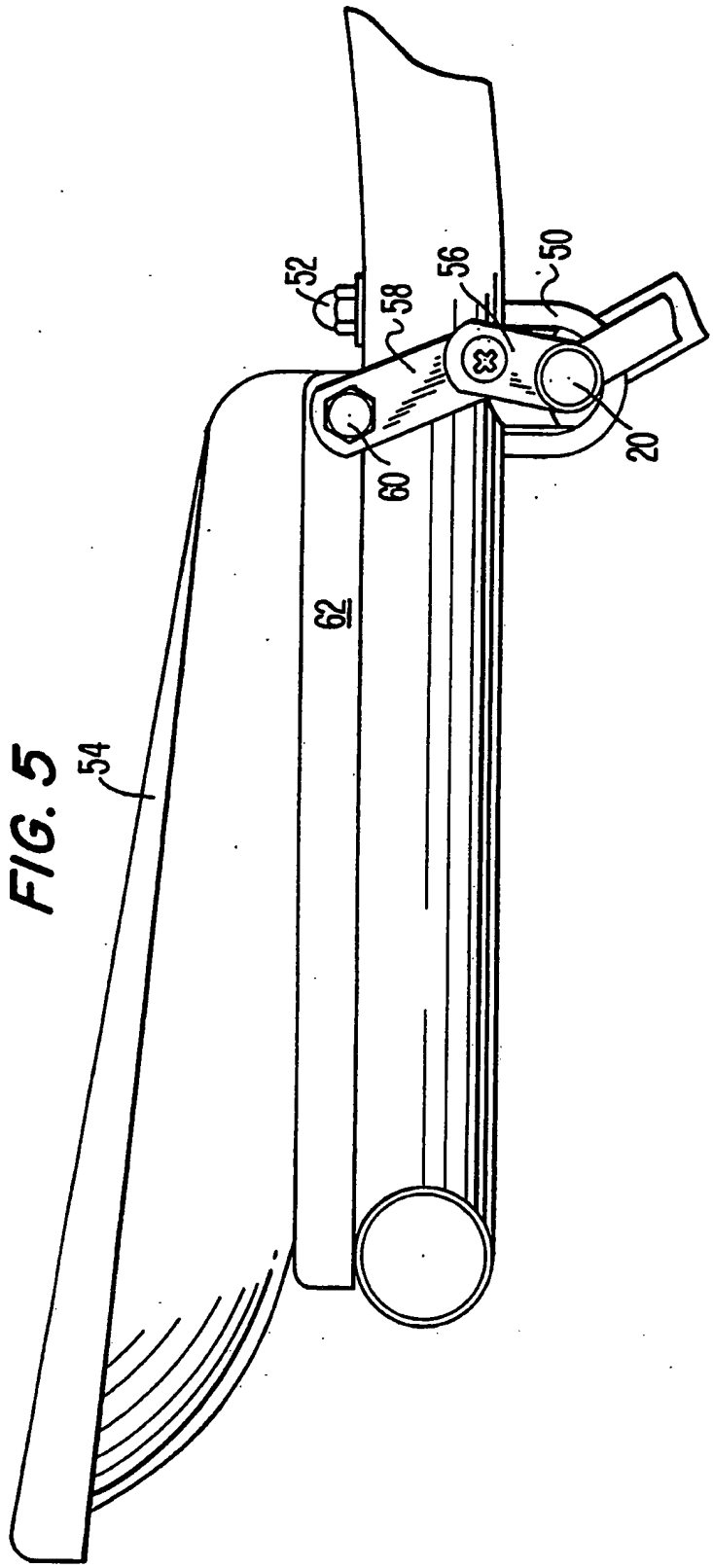


FIG. 5

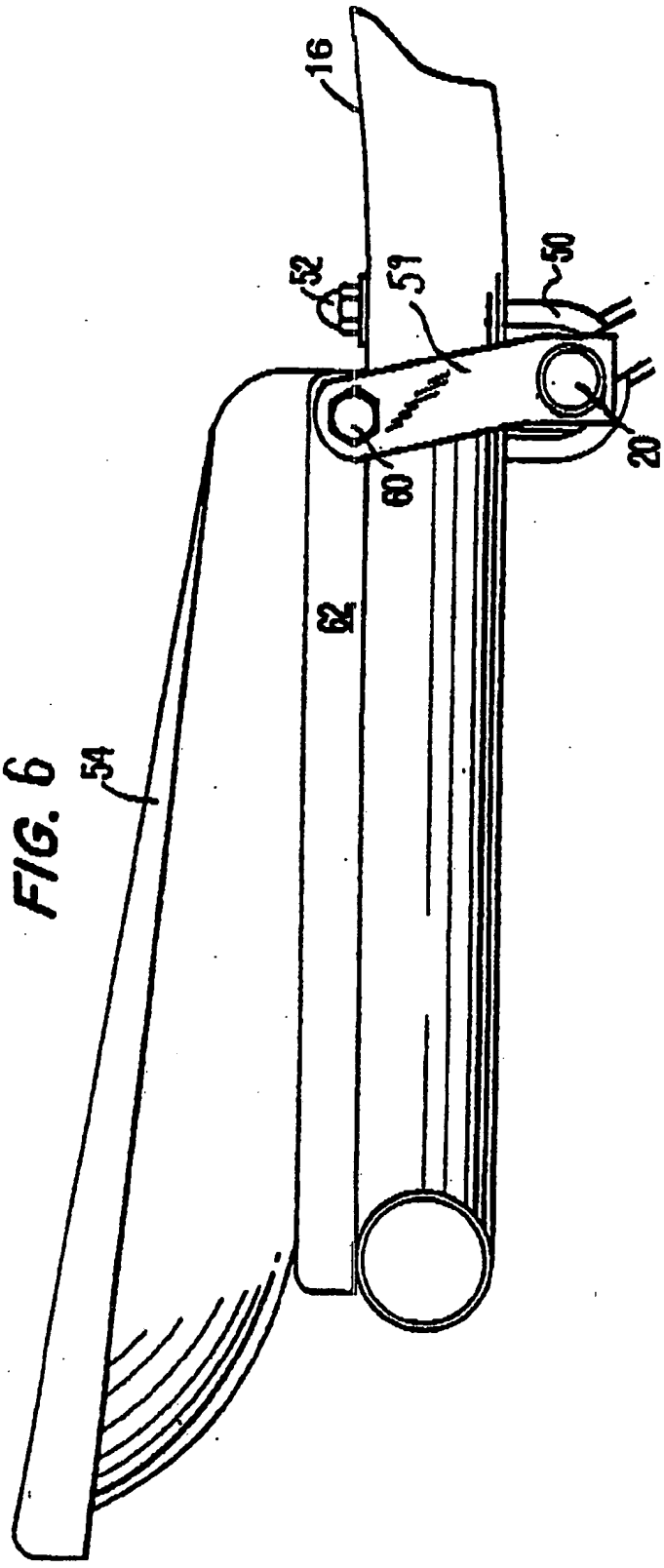


FIG. 6

INTERNATIONAL SEARCH REPORT

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent classification (IPC) or to both National Classification and IPC

Int. Cl.[5] B62C 1/08, 5/02

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC	B62C 1/08, 5/02

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

AU : IPC as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category*	Citation of Document, [11] with indication, where appropriate of the relevant passages [12]	Relevant to Claim No [13]
X	AU,A,60748/80 (CONTINENTAL ENGINEERING LTD.) 28 January 1982 (28.01.82). See page 6, lines 3-8; page 7, lines 17-21 and Figure 1.	(1-3)
X, Y	US,A,4095815 (MITCHELL) 20 June 1978 (20.06.78). See whole document.	(1-10)
X, Y	US,A,4078829 (DAVIS) 14 March 1987 (14.03.78). See column 3, lines 21-67; column 4, lines 32-60; column 5, lines 6-13 and 38-42 and Figures 1 and 3-5.	(1-3,10)
X	US,A,3482851 (PICKARD) 9 December 1969 (09.12.69). See column 2, lines 62-64; column 3, lines 42-44 and Figure 2. (continued)	(1-3)

* Special categories of cited documents : [10]

"A" Document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior t the international filing date but later than the priority date claimed

"T" Later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
23 June 1992 (23.06.92)	1 July 1992 (01.07.92)
International Searching Authority	Signature of Authorized Officer
AUSTRALIAN PATENT OFFICE	C.M. WYATT

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

X	AU,A,57240/86 (R.J. WALSH AND SONS PTY. LTD.) 8 January 1987 (08.01.87). See whole document.	(6)
Y	US,A,3907325 (GAINES et al) 23 September 1975. See column 2, lines 53-56 and Figure 3. .	(10)
X	US,A,4313611 (HEINZE, Jr. et al) 2 February 1982 (02.02.82). See column 2, lines 51-66.	(1-2)
X	US,A,3503624 (WEBER et al) 31 March 1970 (31.03.70). See Figures 6-8 and 10-13.	(1-2)

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE [1]

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim numbers ..., because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim numbers ..., because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claim numbers ..., because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4a

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING [2]

This International Searching Authority found multiple inventions in this international application as follows:

(a) A horse drawn sulky having means for shifting the weight transference between horse and shafts as claimed in claims 1-5.

(b) A horse drawn sulky having its wheels transversely offset relative to the longitudinal centre line between the sulky shafts as claimed in claims 6-10.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.
2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:
3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:
4. ☒ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL APPLICATION NO. PCT/AU 92/00148

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report	Patent Family Member
US 4095815	CA 1038416
US 3503624	SE 350738

END OF ANNEX